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QUARTERLY

VOLUME 3 NUMBER 4 AUTUMN 1953

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★ ★ INSTITUTE

● Gottfried Silbermann progresses through an adventurous adolescence and youth in this isuue. We can already see the formation of the striking character that was to make him a legendary figure in German musical annals. We can also see how his work represents the confluence of several different courses of development: the Italian, through Casparini; the French, through work with his brother in Strasbourg, and the heritage from his great predecessors in Germany.

In the next issue, we shall begin the account of his own activities as an independent organ builder, and list the dispositions of all but a very few of the organs he built.

● N. Lindsay Norden's choral concerts have for a long time been features of the musical life in New York and Philadelphia. They represent important milestones in the development of public music in the United States. His thought on the subject of a cappella choral music is of the highest interest, especially because of the prominent role which he has played in introducing works of the great Russian school of choral composition.

● The misnomer "baroque," as applied to the modern American organ, has practically disappeared from contemporary use. We have heard it only once recently, in an outlying province where the trends of the past twenty-five years are

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BRIEFS ★ ★ ★

just beginning to penetrate. The common abuse of the word "romantic," as applied to organs, is still prevalent, however, and there is still widespread confusion as to the character of the work of our leading builders.

In order, therefore, to establish a clear perspective of our present position in the long evolution of organ building, we have asked Lawrence I. Phelps to write an article upon this subject that will show the extent to which modern ideas and practice have been drawn from various periods of the past, and also those features that have been newly created in the present era. Such a survey is almost sure to indicate that here, as elsewhere, history repeats itself, although not always in exactly the same manner.

● We sent complimentary copies of the Summer issue to members of the Organ Club in England. The response from members of the club has been unusual and most gratifying. At least one-third of the members took the trouble to write complimentary letters expressing thanks and appreciation, and some have made arrangements to subscribe to the magazine, although this is extremely difficult due to governmental restrictions on exporting American money. In response to a number of requests, we are now attempting to establish an agency through which English subscriptions may be conveniently arranged.

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Fritz Heitmann

MAY 9, 1891 — SEPTEMBER 7, 1953

Just as the material for this issue was being given to the printer, the sad news of the death of Fritz Heitmann arrived. All members of our profession both here and abroad have held him in the highest esteem, and those who were fortunate enough to hear him play or receive instruction from him are especially grateful for his life work and influence.

It is a remarkable coincidence that the article, "Bach's Art of Fugue on the Organ" should have been written for the ORGAN INSTITUTE QUARTERLY in the last days of a life that was devoted to the diligent study and reverent performance of Bach's music, since the "Art of Fugue" was itself Bach's last composition.

Perhaps there could be no more fitting tribute than the following quotation from the Boston Herald review of Heitmann's commemoration of the Two Hundredth Anniversary of Bach's death, at the Methuen Memorial Music Hall on July 28, 1950. In the presence of organists gathered from all parts of the United States he played the "Art of Fugue" and the final Chorale Prelude, "With This I Come Before Thy Throne."

"In Heitmann's flawless performance, he seemed in every phrase, every note and even every gesture at the console to be intent only upon revealing both the structural and spiritual significance of each part of the music.

"He succeeded in subordinating himself to the ideas and purposes of the composer in such high degree that his listeners not only were conscious of listening to the musical utterances of the great composer, but were very conscious of Bach's personality and spirit."

Many American organists who were present on that historic occasion, those who heard his performances elsewhere, and especially those who came under his personal influence, will want to follow his suggestion and example and undertake the organ performance of the "Art of Fugue" as a memorial to Fritz Heitmann.

ET ERIT IN PACE MEMORIA EIUS.

Bach's Art of Fugue on the Organ

By FRITZ HEITMANN

The musical world has long been interested in the realization in sound of this last work of Bach, which he bequeathed to the world without any indication of its instrumentation, although written in score form. While at first orchestral performance with variety through alternation and collaboration of strings, woodwind, brass, harpsichord and organ as favored, preference later was given to performance as chamber music for strings alone, in which form it has been heard most frequently in recent times.

The efforts toward authentic realization of this mysterious masterpiece led of necessity to performance on the organ as a solo instrument, since in structure and feeling it is similar to fugues of the purest type, whose peculiar characteristics are probably best represented by the majestically passive sound of the organ. In our time, the competent organist should feel an obligation toward this masterpiece; and an organist who has devoted his entire life to Bach research and to bringing to life Bach's entire organ compositions can not and will not fail to use his instrument to recreate the "Art of Fugue."

Fugues and "contrapuncti" written in score form by composers do not necessarily require orchestral performance in all instances. In this case Bach may have been following a custom that prevailed during the first half of the seventeenth century and which he encountered in polyphonic organ works while studying those of Frescobaldi. The belief is now becoming more generally accepted in musical circles that the most appropriate performances of this music are effected with keyboard instruments. By far the greatest number of Bach's instrumental fugues were written for keyboard instruments. However, a complete performance of this work on the harpsichord (or pedal harpsichord) would hardly be satisfactory because of the extremely limited variety of tone quality. The organ, on the other hand, offers far more tone colors which are also much more perfectly sustained. The effectiveness of actual performances on the organ may be judged from the accounts appearing below.

What argument could possibly be invoked against performance on the organ? The few minor instances of notes extending beyond the compass of the manuals and pedals of Bach's organs are of no significance. They occur repeatedly in Bach's original organ solos and have long since been compensated for by the extension of the

keyboard. However, Bach, in his organ scores, never took into consideration the so-called short octave in the bass common in his time. Despite the absence of several keys, he always wrote as though all keys were available. With the exception of the mirror fugue (Counterpoint 17), written, according to Bach's sole indication regarding instrumentation in the entire work, "for two keyboards" (i.e., in this case for two players on two instruments), all the counterpoints of the "Art of Fugue" can be executed by one player in the regular manner of organ music. It will seem necessary to play a number of the counterpoints on the manuals only, since the lowest voice is not always suited for pedals. This is fully justified by the fact that we have a considerable number of Bach's organ works written for manual only (for example, in the Clavier Exercise, Part III), in which Bach likewise refrained from using pedals for the bass part.

Whether or not something is suitable for the organ may in some degree be determined with reference to Bach's original organ works, in which he exhibited great audacity and liberality with respect to the instrument (for example, in the E Minor Fugue of the Leipzig period, the arrangement of the "Last Supper Chorale," "Jesus Christ, Our Saviour," from the Clavier Exercise, Part III, and in arrangements of Vivaldi's Concerti Grossi for the organ). Compared to these works, the counterpoints of the "Art of Fugue" can be considered quite mild with regard to his treatment of the organ. Upon comparing the style of the important organ works written after Bach's death (the great compositions by Reger, or outstanding contemporary organ masters) with the counterpoints of the "Art of Fugue," the latter will seem to be classic examples conforming to the essential character of the instrument in the highest degree. Therefore, one should not have any hesitation in presenting the work on an organ possessing the tonal resources of a Bach organ.

The main requirement is that the polyphony of the counterpoints reaches the ear of the listener with the utmost clarity and songlike plasticity. In general, large cathedrals are poorly suited due to disturbing echoes; smaller churches are preferable, the more so since the fugues that are to be played on a large scale are alternated with a number of counterpoints that should be played in tre manner of chamber music. The fact that the two-voiced canons and the three-voiced fugues are more readily understood at first hearing than the extensive four-voiced fugue is quite natural and does not speak against the possibility of performing them. The most com-

prehensive original organ work by Bach (the third part of the Clavier Exercise) contains, in addition to short, readily understood chorale arrangements with few voices, several five- and six-voiced chorale arrangements with the most highly developed polyphony and, in some instances, the most complicated rhythms. Bach did not write this merely for the eye to see, but for the ear to hear.

The complete performance of the "Art of Fugue" on the organ constitutes a problem, inasmuch as the almost two hours required for its presentation will certainly bring about premature fatigue, even in the most receptive listener, due to the inflexibility of organ tone. (Paul Hindemith once told me after one of my presentations of the Bach Clavier Exercise, Part III, on the Schnitger organ in the chapel of the Charlottenburg Castle, "I can listen to polyphonic music with complete concentration for one hour only.") Therefore, in planning a recital of about one hour, I consider it advisable to select the essential counterpoints of each of the fugue groups and to arrange the program so that a fugue to be played on Bach's Organo Pleno is followed by a two- or three-voiced counterpoint of lighter tonality, and with otherwise well considered alternation. Since the sequence of the counterpoints as arranged by Bach himself is not definitely established, at least for the latter part of the work, no objections can be raised against this procedure in actual performance.

It should be borne in mind that the presentation of the "Art of Fugue" does not constitute the recital of a "lesson" (it is that also — and this aspect of the miraculous work cannot be studied enough at home) ; but it involves the interpretation of one of the most live and timeless creations. It is the task of the performing artist in public presentation to evoke this revelation in his audience, which certainly will include persons other than expert musicians.

It is self-evident that this task must be approached on the organ in a manner different from that of the string quartet or orchestra. Compared to an orchestral performance in one of the various arrangements, the realization on the organ affords the advantage of being more typical of Bach because it eliminates those subjective elements of performance which are contrary to the nature of the organ and which are almost inevitable on other instruments. It should not be forgotten, however, that even with ideal performance on the organ of carefully selected portions, the first performance will overtax the receptivity of many listeners. Only repetition at intervals will provide the opportunity for intimate identification of all the details of the work. In this same way, the complete perform-

ance of Bach's Clavier Exercise, Part III, was accepted only during the last few decades (as late as twenty years ago experienced organists considered it inadvisable if not impossible). The presentation of the "Art of Fugue" on the organ will gradually but surely achieve general recognition.

The fact that the present time is ready for the "Art of Fugue" on the organ is attested by the success of these organists who have played it, not only in Germany, but also in Holland, Switzerland, and the United States of America. From my own experience, I can report that both the Clavier Exercise, Part III, and the "Art of Fugue" made the strongest impression upon a circle of listeners — who, it is true, were already receptive to such works — when I performed them in the United States in the Bach year of 1950. The work is performed at least once a year in the crypt of the Berlin Cathedral, seating 1400 people, where the relatively small slider-chest organ of neo-baroque resources and favorable acoustics offer the best conditions. This takes place on one of the solemn high feasts in order thus to characterize its special significance, always with all seats in the church taken. Therefore it is possible, as is the case in the other great works of Bach, to create a tradition also for the "Art of Fugue" in recital on the organ.

In this form, Bach appears extraordinarily modern. The "Art of Fugue" contains — and this is its strongest contact with the present time — durable elements which are held together by tremendous creative power, through the strict forms of canon and fugue. This, in contrast with several contemporary public expressions, explains the emotional impact of the work, which interprets the inspiring assurance of a cosmic order arranged by God.

The spirit of the organ is the spirit of the fugue. Surely the towering quadruple-fugue (Counterpoint 11 of the "Art of Fugue") represents one of the mightiest organ compositions of all time, not excepting the Passacaglia and the great G Minor Fantasy and Fugue! And what wondrous and intensive life is given to the mysterious, playful two-voiced canons in the light of typical organ coloring!

This should be understood: The monumental torso of the "Art of Fugue" (this designation was not given by Bach; he perhaps would have named it "Clavier Exercise, Part V" if the completion of the work had been granted him) does not belong on any ordinary organ or in any ordinary place. Its interpretation, if done with an organ, should be executed on an instrument built according to the ideas of Bach, under the most favorable acoustic conditions,

in a place of worship, and only by a mature artist. Then it will become more and more apparent that this incomparable work of art, which touches the very depth of creation and which represents one of the pillars of occidental musical development, has it proper home in the organ with its mysterious, reserved, and majestic sound.

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Untempered Intonation

By N. LINDSAY NORDEN

The Golden Rule of a cappella music is that it must be sung with untempered intervals. This gives it a smoothness and beauty that no temperament can provide. This is the reason why a fine a cappella choir, or chamber music without piano, has a distinctive appeal that nothing else can match.

All temperaments are alterations of the pure, or just, scale. Temperaments came into being primarily on account of keyboards, which created the necessity for a limited number of levers for the fingers due to the restricted finger-stretch of the hand. Many temperaments were developed but the two tunings now in use are Equal Temperament and Just Intonation. Another intonation, Meantone Intonation, preceded Equal Temperament. In this intonation the major thirds were correct, but the fifths were quite flat; and since the keyboard had assumed the form of eight white keys and five black keys, it was possible to play in only a limited number of keys, — B flat, F, C, G, D, and A majors and g, d, and a minors. The keyboard was tuned as follows, C, C sharp, D, E flat, F, F sharp, G, A, B flat, B, and C.

In order for the major scale to contain the three major triads, C-E-G, G-B-D and F-A-C, it must consist of the following overtones of a fundamental, or generator. Thus a fundamental, F, produces the following scale of C major,

C	D	E	F	G	A	B	C
24	27	30	32	36	40	45	48

Thus the C major scale is based upon F, not on C. Present-day theory books are written as though there had never been any change in intervals since they came into use. They endeavor to explain the creation of the scale through the expansion of a fifth; this is Pythagorean Intonation, never intended for use in harmony. Chords played in this intonation sound horrible, due to the bad beats created by mistuning. Current harmony manuals are simply an attempt at an analysis of Equal Temperament.

If C is taken as a starting point and a series of fifths laid out, G D, D A, A E, etc., and then this E is reduced by octaves until it fits into the triad C-E-G, it is dreadfully out of tune, for it is not a third, but a transposed fifth!

The chords that belong to any given key are formed from a

series of central, or axis-fifths and the thirds above and below these fifths. No other chords are possible within a key-area, save seventh and ninth chords.

	Key-area of C			
thirds above	A_1	E_1	B_1	F_1 sharp
axis-fifths	F	C	G	D
thirds below	D^1 flat	A^1 flat	E^1 flat	B^1 flat

If this axis-series is extended beyond the key-area of C, — A E F sharp are added; but these tones in the fifth series are not the same tones as those having the same letter name in the third series. In order to obtain a clear and precise measurement of intervals it is possible to divide the octave into *cents*. An octave contains 1200 cents and a tempered half step is assumed to contain 100 cents, though in actual practice this distance varies considerably due to inaccuracies in tuning keyboard instruments. To separate true thirds from true fifths a small numeral is used to the right of the letter, either above it or below it. Thus the difference between D and D_1 is a comma, or approximately 22 cents; ratio 80:81. Equal Temperament does not distinguish between these two pitches. The difference is about a fifth of a tempered semitone and is easily distinguishable even by an untrained ear.

All chord intervals are based on a harmonic series projected from a fundamental. In such a series the perfect fifth has the ratio 2:3, the major third 4:5, and the minor third 5:6. These thirds are recognized in Equal Temperament, but there are also subminor thirds, ratio 6:7, and the supermajor thirds, 7:9. These occur in the harmonic dominant seventh chord and the harmonic dominant ninth chord, respectively. Another "third" occurs in the so-called "diminished seventh chord," that is, 14:17.

The error in assuming that the scale is created by extending a series of fifths is the pitfall for much musical theory and practice. Again, no tone in the fifth series is ever the same pitch as any tone in the third series. The major third is 386 cents, the sharp third (the transposed fifth) 408 cents, and the Equal Temperament third 400 cents.

The true major scale, then, affords three major triads, I, (C-E-G), IV, (F-A_1-C), and V, (G B_1D); two minor triads VI, (A_1-C-E_1) and III,(E_1-G-B_1); a *grave* minor triad, II, (D F A_1); and the diminished triad VII (B_1 D F). The ratios are

Major	4:5:6	Grave Minor	27:32:40
Minor	10:12:15	Diminished	45:54:64

It is very important to note at this point that the "D" which is a fifth above G is not the same "D" that is a fifth below A_1. Or to state it simply, A_1 down to D forms an interval having the ratio 40:27 (a *grave* fifth); but the fifth up from G has the ratio 36:45, or, reduced to simplest terms, 2:3, (a *pure* fifth). This is perhaps the most dangerous pitfall in a cappella music, when composed by individuals who think in Equal Temperament (which nearly all modern musicians do!). A *grave* fifth consists of 680 cents, while a pure fifth has 702 cents. A pure fifth below A_1 is D_1, 22 cents below D.

This situation indicates clearly that the use of certain chords *within* the key must be handled correctly if the intonation is to be true and the sense of tonality maintained. If a II, a IV, or a VI chord is used, care must be taken not to lead such a chord to a V, V^7, or V^9, for the "D" in these chords is scale D and not D_1 (which is in the key-area of F major). It may be said as a general rule that it is not possible to pass from the subdominant side to the dominant side without passing through the tonic harmony. If a chord of the dominant group passes to a subdominant member and immediately returns to a dominant member, for example V, II, V, — this "II" will consist of D-F^1-A, instead of the scale tones D-F-A^1. The chord D-F^1-A is in the key-area of G.

The fundamental form of the chord D F A_1 is the arrangement F A_1 D, ratios 16:20:27; F is the bass, not D. If confusion exists in an a cappella composition regarding these "II" chords, the singers will deviate from the pitch, with the resulting flatting, or off-pitch tones. In Equal Temperament all the scale tones are off pitch to some degree. The diagram following will compare the two intonations.

	Pure Intonation	Equal Temperament
Minor second	112 cents	100 cents
Major second	204	200
Minor third	316	300
Major third	386	400
Perfect fourth	498	500
Perfect fifth	702	700
Minor sixth	814	800
Major sixth	884	900
Minor seventh	996	1000
Major seventh	1088	1100

From this it will be seen that the thirds and their inversions, the sixths, are the most out-of-tune intervals in Equal Temperament.

A cappella music can be sung only in untempered intonation and has always been so sung. When an interval is mistuned, beats are created. The method by which all tuning is effected is to tune a second tone to a single selected tone so that there are no beats. The piano tuner, tuning in Equal Temperament, mistunes the intervals by so many beats. The violinist, to the contrary, tunes his fifths perfectly — no beats. If one person sings C and another attempts to sing E_1, the second will tune to the first so that there are no beats. He does this "by ear." If a third person sings G, this singer will tune to the E_1 and C, already in tune, so that there are no beats, and so on. All Equal Temperament chords have beats in them, and such chords can be produced only by means of an instrument previously tuned. On the piano these beats diminish very rapidly, of course, but they are much more in evidence on the organ.

The smaller ratio numbers are for any interval the more mistuning it will take, for the beats will be slower. But no singer at any time could possibly determine in actual performance just how flat or how sharp to mistune any interval. An untrained singer may sing off-pitch, but that is not Equal Temperament. As soon as a chorus is well trained the singers will feel the relation between the tones of chords. When this is attained the only elements that will cause trouble will be impossible modulations or confusion of chords within the key. A good example of impossible a cappella modulation is the hymn tune "Galilee." This is in B flat major; and at the end of the second line the music modulates into the key of the third of that scale, in other words D_1 (the scale is B flat, C, D_1, E flat, F, G_1, A_1, B flat). Then the music returns by dominants, that is, D_1 to G_1 to C_1 to F_1 to B_1 flat, which is 22 cents flat of the original tonality of B flat. B flat to D_1 is 386 cents; B $flat_1$ to D_1, 408 cents.

In order to obtain pure chords, the director will be obliged to spend considerable time in rehearsing pitches, that is, building chords on the roots, thirds and fifths. (Later add sevenths and ninths and certain inversions.) *There must be no beats.* Humming is useful, for then all participating can hear well. It may be advisable to start with simple intervals before trying chord structures.

When two or more tones are sounded simultaneously, difference, or resultant tones are created. For example if C and E_1 are sounded, ratio 4:5, a difference tone 1, or CCC is created; and if the tones are strong enough 1 will combine with 4 to produce a second resultant, 3, G. At least the first resultant is audible if the tones are sustained. Resultants are very difficult to hear on a piano, with its fading tones,

but in *any* kind of musical production they color the results. When a chord is played in Equal Temperament the resultants are out-of-tune with the chord and there is a cluster of pitches around a pitch that should be single and correct. For example, the resultants for C-E_1-G (ratios 4:5:6 in pure intonation) in Equal Temperament are a sharp 1 (for C to E is 14 cents too large); a flat 1 (for E to G is 16 cents too flat); also a less flat 1 (for C to G is 2 cents too flat). When the chords are in tune the resultants are more favorable to the tones of the chord, often entirely coinciding with these tones, in a lower octave. This adds an important element to the beauty of the over all effect.

Of course, the same is true in the matter of overtones. When a chord is correctly tuned, the lower overtones of the lower chord tones coincide with some of the upper chord tones. But when a chord is in Equal Temperament the overtones of the lower chord tones are sharp or flat of the upper chord tones. The lower the ratio numbers of any chord the more consonant is that chord. The intervals that produce resultants unfavorable to many chords are the major thirteenth (10 minus 3 is 7), minor thirteenth (16 minus 5 equals 11, a tone not used in musical practice), minor tenth (24 minus 10 equals 14). The doubled third of a major triad removed one octave is bad, too, (20 minus 5 equals 15). This is perhaps the reason for the rule never to double the bass of a first inversion, and also the rule that the alto part must not be separated from the soprano part or the tenor part by more than an octave. Some intervals increased by an octave produce resultants that are antagonistic. Theory books do not differentiate sufficiently between a third and a tenth, or a fourth and an eleventh, etc.

A well-trained chorus will always sing a harmonic seventh, probably without knowing that they are doing it. The reason is simple. A diatonic dominant seventh chord has the ratios 36:45:54:64, or G-B_1-D-F; but 64 is very near 63, and if 63 is used the whole structure is divisible by 9. This reduces the ratios to 4:5:6:7, a *much* more harmonious chord. The voice part having the seventh will invariably slip into the lowered seventh; it cannot be helped! The diatonic seventh consists of 996 cents, the harmonic seventh of 969 cents. This chord is not recognized in the theory books, nor, for that matter, is the harmonic ninth. In them, all is based upon a Pythagorean scale consisting of the following ratios,

C	D	E	F	G	A	B	C
384	432	486	512	576	648	729	768

which is, of course, completely wrong!

The diatonic dominant ninth chord consists of G-B_1-D-^{7}F-^{9}A, ratios 32:45:54:64:80. But if 80 is raised to 81 (a comma), the chord becomes 32:45:54:64:81 and the whole structure is divisible by 9, thus reducing it to 4:5:6:7:9, a much more consonant chord and the one that will be used by a cappella groups. Neither ^{7}F or ^{9}A are in the scale of C major.

The dominant ninth chord in minor or VII^{7} (called a diminished seventh chord) in Equal Temperament is assumed to consist of three minor thirds. Diminished seventh chords are to a large extent used in Equal Temperament for purposes of modulation; but when a singer comes to the end of a section of a composition and he is singing D sharp and the written music changes enharmonically to E flat, he cannot change his pitch and if the music progresses in such a manner that he cannot return to the original pitch, he cannot sing the original D sharp. He is out of tune, off key, and will remain so. Compositions so written are unsingable a cappella no matter how much they are rehearsed.

The proper tuning for the chord G-B-D-F-A flat is G-B_1-D-^{7}F-^{17}A flat; the seventeenth harmonic is 105 cents above G so that it is not badly out of tune on the piano, for G to A flat is 100 cents, but the rest of the chord is badly off. The above chord is not hard to produce; but it is impossible to tune it as a series of minor thirds, that is, a diminishing seventh chord, a product of Equal Temperament.

Cents in Just Intonation	386	316	267	336
	G	B_1	D	^{7}F ^{17}A flat
Cents in Equal Temperament	400	300	300	300

The minor scale and chords present additional difficulties which can be touched upon but very briefly in this short resume. The ratios for this scale are much more complex; the generator for C minor is D^{1} flat.

C	D	E^{1} flat	F	G	A^{1} flat	B^{1} flat	C
120	135	144	168	180	192	225	240

The whole effect of this scale is much more dissonant than the major scale. In the triad C-E^{1}-flat-G, ratios 10:12:15, the resultant tones will be 2, 3, 5, etc., but 2 is an A^{1} flat and antagonistic to the chord. Other arrangements of a minor triad produce other antagonistic resultants; some of these are tones not used in musical practice. For example the chord C (10) G (15) E flat (24) C (40) produces resultants 14 (^{7}G flat), 9 (B^{1} flat), 25 (E^{1}), 16 (A^{1} flat), all of which are not in the chord. In all minor keys there is a "shadow" of dissonance which follows along behind the chords.

The seventh chords, again, require considerable analysis, which cannot be worked out in this brief article, save to say that to any major triad the harmonic seventh may be added. In the key-area of C the seventh chords are F-A_1-C-^{7}E flat, A^1 flat-C-E^1 flat-^{7}G flat, D^1 flat-F-A^1 flat ^{7}C flat, E^1 flat-G-B^1 flat-^{7}D flat, and C-E_1-G-^{7}B flat. Often these are incorrectly notated; due to confusion of Equal Temperament; ^{7}E flat is often written "D sharp," ^{7}G flat "F sharp," etc. The chorus may be trained to sing these as harmonic dominant seventh chords. With a little listening there will be no difficulty in obtaining the harmonic seventh in whichever part the composer has indicated it.

The conductor will be amply rewarded for all the time and patience spent in producing pure intervals. He may begin, at first, with simple intervals, fifths, fourths, major thirds, minor thirds, etc., later building chords, starting with major chords. If there is any difficulty, first produce the octave in the chord, between whatever voices may be assigned to it. Then add the fifth, and finally the third, for this is the most difficult tone to produce in tune. This process should be used in fundamental position and all inversions. Then work on the seventh and ninth chords. Following this, attack the minor chords. Always insist on pure, clear chords. A singer with a wobbly tone will hamper fine intonation considerably. Take the part in trouble and make the singers listen to the pitch. Keep away from Equal Temperament as far as possible. A chorus can sing only Equal Temperament when an accompaning instrument plays it, but they must be taught to feel the difference between the two intonations, in order that they may make the adjustments. It is just as easy to tell the difference between a just interval and a tempered one as it is to tell the difference between a red light and a green one.

It is amazing to discover the number of musicians who cannot, or do not wish to feel the difference between these intonations. Many musicians who perform on pretuned instruments do not understand this at all! But orchestral players do, and they always play in the best possible intonation. In the classical compositions this is possible a great deal of the time; but in modern, dissonant compositions any pitch does, for there is little to which to tune.

Before attempting to produce any a cappella composition the conductor must analyze the piece to see whether it is truly possible a cappella. If not, it should not be attempted. There is a great difference between "music on paper" and "music in sound"! With the

older masters who were under the influence of Meantone Intonation it is often necessary to instruct singers where, in some part, to make a comma shift, by tuning anew to a sure pitch.. Every choral conductor has to rid himself of the idea that because a composer has marked his work to be sung a cappella that it can be so rendered. Many cannot! In pure intonation every tone has its pitch and it is *not* the intonation of any other tone. An augmented fourth is *not* the pitch of a diminished fifth (except in Equal Temperament). The augmented fourth consists of 590 cents and the diminished fifth of 610 cents — a difference of 20 cents. In Equal Temperament, since the piano key "G sharp" does for G_2 sharp and also for A^1 flat, if C to A^1 flat is played it is called a minor sixth, ratio 5:8 and a consonance; but when it is thought of as G_2 sharp, it is an augmented fifth, ratio 16:25 and a dissonance. But the sounds are the same! This has all but ruined many ears. Fine pitch discrimination has been lost. A cappella music being based upon the natural laws of the universe, brings us nearer to the Center, or God. It is not man-altered: it is based upon eternal, unchanging laws. For this reason it has a beauty and a charm that are unchallengeable.

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A Letter From Hennie Schouten

It is a great pleasure for me to comply with the request of the Editor of the ORGAN INSTITUTE QUARTERLY with this short summary of my book "*Improvising on the Organ*," published several months ago. From the Introduction:

> "It goes without saying that exceptional ability is the first *sine qua non* essential to expressing oneself in a personal manner in major musical forms like the sonata, fugue, variations, etc. And it is no exaggeration to say that only those organists who have grown up in this tradition can properly be called improvisers. This, however, is not the last word about improvisation, for most church organists are confronted with improvisation problems every Sunday. The average church organist does not need to improvise fugues and passacaglias, rondos or scherzos, and no one demands that his spontaneous creations must be characterized by original melodic invention or striking contrapuntal skill.
>
> "Every church organist, however, must be able to elaborate on a musical phrase derived from the service in a simple, cohesive, and logical manner. The purpose of this manual is to assist student organists in mastering the technique of elementary improvisation."

After preliminary exercises in harmonization at the organ, the pupil starts with improvisation for one voice. The first exercise is the improvisation of a concluding phrase of four bars based on a given introductory phrase. Very methodically, different possibilities of melodic structure are explored. After that, the pupil must improvise complete phrases of eight bars in various keys and with various rhythmic groupings.

Four-part improvisation begins with phrases consisting of half notes exclusively. All rhythmic complications are avoided at first, while the pupil not only must complete and harmonize the first phrase, but also must think of good fingering and footing. When he has studied a number of these easy exercises, he will be able to begin with more complicated phrases. He then is required to complete the introductory phrase with a modulating concluding phrase. Then the pupil can begin with improvisation in simple binary and ternary form, and homophonic chorale preludes.

Not infrequently, it happens that a student who is able to solve all kinds of contrapuntal problems on paper experiences great difficulty when it comes to elementary contrapuntal improvisation. The cause of this, often enough, it that his polyphonic ear has not been developed adequately. In order to improvise two parts, one must of necessity be able to follow two parts simultaneously, and also to hear them very exactly in the mind's ear without actual performance.

There are various methods of developing one's polyphonic ear. It is very useful to play canons in which only the subject is given. This compels the organist to follow two voices simultaneously. In this case, however, the subject must be memorized separately. If it is played from the music, it is bound to be combined automatically by the eyes instead of by the ears.

The English translation of this book will be published soon by Paxton & Company of London, with a foreword written by the well known organist Flor Peeters. I should be grateful if my colleagues abroad would give their attention to this book and write me their reactions to it. There is nothing more valuable and stimulating than international cooperation in the advancement of our magnificent art.

Hennie Schouten

Box 50

The Summer issue stimulated an unprecedented correspondence. The Busman offended a few singers, but apparently delighted a good many organists who have long been vexed by the unmusical nature of singers. One organist has devoted some time to methods of ascertaining by deductive reasoning what notes singers are supposed to be singing, a sort of system of translating their fluttering cries into music. He finally abandoned the project; singers are too unpredictable.

Most of the correspondents commented on the two articles presenting more or less opposite views about the slider chest, by John Challis and G. Donald Harrison. The latter earned widespread gratitude and appreciation for his eminently reasonable and tolerant presentation of his ideas, although one person ventured to suggest that Mr. Harrison's reasoning may have been influenced by policy. Mr. Challis won resounding applause from slider-chest enthusiasts, but also drew sharp fire from others. So many of the latter raised the same issues that it may be worth while to present a summary of them here. Readers would like to know:

(1) Where can they see, hear, and play on the organs voiced on 1 1/2" and 1 3/4" wind pressure, of which Mr. Challis approves? The great works of Schnitger and Silbermann are known to have been voiced on higher pressures.

(2) Where are the organs which "blend" better than the best of contemporary examples? Some feel that many modern instruments are excellent in this respect.

(3) With regard to "accent," controlled by the rapidity of key descent in direct mechanical action, just exactly what takes place in the note channel and pipe when the key is depressed slowly that is different from that which occurs when it is depressed rapidly; and how can the difference in the resulting sound be described? This question has been widely discussed both in correspondence and at the Summer Session of the Organ Institute. One world traveler, who advocates mechanical action on these grounds, observed that there were probably not more than five organists in the world who know how to use mechanical action so as to produce effective variations in the speech of pipes. The general consensus seemed to suggest that an even smaller number of organists has ever been able to hear such differences, although a good number professed to have noted a disagreeable *out-of-tuneness* in the attack of some modern examples of mechanical action.

★ ★ ★ THE ORGAN BUILDER ★ ★ ★
★ ★ GOTTFRIED SILBERMANN ★ ★

By ERNST FLADE

● *By permission of the German publishers, Kistner and Siegel of Leipsig.*

PART TWO

Andreas Silbermann of Strasbourg

The Youth and Apprenticeship of Gottfried

The Elopement that Failed But Enriched the Bridegroom

The first known records of the Silbermann family indicate their early residence in the Erzgebirge. Their name is derived from silver mining, which flourished around Freiberg from the sixteenth to the eighteenth century.

In the first list of citizens of the city of Freiberg, dating from the middle of the fourteenth century, there are no inhabitants by the name of Silbermann, but the name is listed in a Freiberg tax list of the year 1546.

Two Silbermanns appeared in Leipzig and Halle at the beginning of the seventeenth century. Both had friendly relations with famous musicians of the time. Valentin Silbermann, as one was called, was a woodcarver in Leipzig and acquainted with Andreas Duber and with Calvisius. The latter, who was one of the most distinguished of Bach's predecessors at Leipzig, is supposed to have "shaken hands" with this founding father of the organ-building family. Since, however, most of the Frauenstein church records were destroyed by fire, it is not possible to trace a direct line of descent from Valentin Silbermann to Gottfried Silbermann. Hans Silbermann, in Halle, belonged to the circle of Samuel Scheidt. Whether these two came from the Silbermanns of the Erzgebirge is not yet known.

The two organ builders, Andreas and Gottfried Silbermann, came from a strong and vital branch of the family which lived in the town of Frauenstein. Their great-grandfather was a home owner, Georg Silbermann, in Kleinbobritsch. He was born near the end of the sixteenth century. His second son, Veit, born in about 1620, acquired real estate, was nominated a Judge, and died in 1666. From a third marriage, Veit Silbermann had three sons, Abraham, Andreas, and Michael who was the oldest and father of the famous organ builders. He was born in 1640 and married Christine Tröger, daughter of a landholder from his home town. The children of this marriage were Christian Silbermann, later a miller, and Georg Silbermann, a distinguished physician, "dean of the church and city council" in Glashütte. When this boy was three and a half years old, his mother died. In that same year, his father married again. The second wife was Anna Maria Preissler, daughter of a gardener from Gross-Walthersdorf. At the time, she was in the service of the mayor of Frau-

enstein, Gottfried Karden. Just as at his first marriage, Michael Silbermann ordered "figured music" from the cantor, whereas his brothers had only "choral style" wedding music. Michael Silbermann soon became *Amtszimmermeister*, or official carpenter of the district. Besides the two sons of the first marriage, he left four sons from his second marriage: Michael (later also *Amtszimmermeister*), Andreas and Gottfried, the famous organ builders, and Abraham. Gottfried remained a bachelor and Abraham died young without descendants; but Andreas became the head of the family line in Alsace, which flourished until the middle of the following century. The carpenter, Michael Silbermann, II, in Frauenstein, was founder of the line in Saxony. Of his sons we shall learn more later, especially about the Dresden carpenter, Michael Silbermann, III, and the Freiberg organ builder, Johann Georg Silbermann. Another brother named Abraham lived in Freiberg. He was also mentioned among those in the service of his uncle, Gottfried.

The sons of Michael Silbermann, I, were born in the idyllic little village of Kleinbobritsch near Frauenstein. The road from Frauenstein Castle leads to the village and to the small house which has a memorial stone tablet above the front door. On it are the names of Gottfried and Andreas Silbermann, with a reference to their importance in the art of organ building. For a long time it was not definitely known in which house the Silbermanns were born. Only Christian Wolfgang Hilf, who deserves the gratitude of the organ world for his study of Silbermann organs and for his efforts toward their preservation, was able to discover the initials "M. S. 1680" covered by plaster, on the ceiling of the little living room in the house in question, thus giving convincing proof that this house was really the birthplace of Michael Silbermann and his famous sons.

In 1693, their father moved into the city of Frauenstein. There is little information about the youth of Andreas Silbermann. He had to flee from military impressment and worked for Casparini in Görlitz at least between 1697 and 1700. Gottfried in Leipzig had the same problem. Because of his extraordinary physique he was in danger of impressment for military service, and so he, too, fled the canvassers of King Friedrich Wilhelm. In about 1700, Andreas came to Alsace, after long wanderings through Germany.

Gottfried was born January 14, 1683, and was christened two days later in the church at Frauenstein. The minister, Kaspar Sattler, added the following words to the inscription in the church records: "May God give life and blessing to this little child." He was named after a relative, Gottfried Dünnebier, who was a weaver and resident of Frauenstein. Among the other godfathers was the toymaker Jobst from Seifen in the Erzgebirge.

Before the Thirty Years' War, Frauenstein was a wealthy city. It is more than suggested by the familiar saying that originated in those times, "If someone should fall out of heaven, he could not fall on a better place than Frauenstein." But in Silbermann's time, the mining industry, which had been prosperous, had declined. Only three such works remained, and they yielded very small profits. The principal occupation was farming. It was profitable because the city was situated on the main road from Prague to Freiberg by way of Teplitz. There was also a profitable trade in butter with the city of Dresden. And throughout the entire district the beer from Frauenstein enjoyed a kind of monopoly. According to the tax returns, Frauenstein had a population of about three thousand in 1697.

Friedrich Christian Leopold, who became rector there on November 10, 1690, should be named as one of the first teachers of Gottfried Silbermann. He was organist at the same time. This somewhat unusual combination is continued there and in Dohna in the present day. He was a student for ten years at the Kreuzchule in Dresden, and there became quite familiar with music. He then studied for three years in Leipzig.

The rector in Frauenstein before him was Christian Liebe, who was called to Zschopau and was one of the most competent musicians of the time. Gottfried Nietsche was the cantor from 1685. He had gone to school until his twenty-fourth year and then studied medicine. The congregation appreciated him because of his unusually strong voice. When he sang, the windows shook.

In Frauenstein, good church music was expected. A *Kantorei* (choir) can be traced to the sixteenth century. In 1611 it had twenty-four members, and it still existed in 1834. For the performance of church music, the choir was supported by the town piper with his four apprentices. In addition to this duty, the piper was obliged, with his apprentices, "to play down from the tower four-voiced serious and gay tunes, in summer at three and in winter at four o'clock, besides at noontime and at the end of working hours." Besides that, his trumpet or trombone had to be heard every hour during the day and every quarter-hour during the night.

Anyone who wanted it could obtain a musical education in any Saxony town at that time.

As may be learned by the estate left by Gottfried Silbermann, he not only was a pious man but also sought inspiration through the study of books like "The True Christendom" by Arndt, "Interpretation of the Psalms," and "Sunday Bible Chapters." He owes his first impressions in that area to the preacher Andreas Werner, a learned man who formerly was court preacher in Moritzburg, and to Deacon Heinrich Homilius, a friend of the Silbermann family.

After Gottfried had finished school, he was apprenticed to his godfather, the toymaker Jobst in Seifen. He probably exhibited some skill in woodworking. But the spoiled boy did not stay long. A new start took him to the bookbinder of Frauenstein. On August 2, 1697, in Freiberg, a bookbinder's apprentice whose name was Gottfried Silbermann and who came from Frauenstein, was released from his apprenticeship. The later organ builder may have been this Gottfried Silbermann, but it is difficult to believe that a boy of fourteen had already completed his apprenticeship. It is probable that he did not complete his training in this calling. As a punishment for mischievous pranks in which not even the Chief Justice was spared, he was imprisoned in the castle. However, he succeeded in escaping to the nearby Bohemian frontier. In Einsiedel, Bohemia, relatives gave him sanctuary until the excitement created by his reckless flight had quieted down. He then started out to join his brother in Alsace. During that wearisome journey on foot in inclement weather, he experienced his Day of Damascus, and was transformed from a heedless Saul into a diligent Paul.

Although Gottfried later said that he had spent "about ten years" with his brother in Alsace, the uncertainty about the date of his arrival must be taken into consideration. Andreas Silbermann became "citizen and resident" of Strasbourg March 13, 1702, and Gottfried evidently came to stay with him in that same year. Probably Andreas, who was accustomed to good manners and appearance, doubted that this tramp, even though his own brother, possessed the strength of character to become a successful organ builder. The hard con-

ditions of the apprenticeship contract seem to suggest this. Gottfried was to receive no pay and had to agree that later, after completing his apprenticeship, he would accept no contracts for work in the area where his master lived. The idea of this pedagogic discipline — not to give the pupil any money — is understandable. The inclusion in the contract of the no-competition stipulation may have been customary when the apprentice could pay no tuition, or may have been a special precaution on the part of an apprehensive business man.

The first work by Andreas Silbermann that can be established by documents as his own was the restoration of the bellows of the organ at St. Nicholas' Church in 1702. In the summer of 1706, the council of that church decided on the building of a new organ "by the two brothers, Andreas and Gottfried Silbermann, who possess great knowledge of this art." This organ was completed in June, 1707, and cost 1200 gulden. It had seventeen stops, was tuned to the "Cornetton," and was dedicated on October 13. From this information it may be inferred that Gottfried Silbermann had finished his period of instruction. He had become a dependable assistant to his brother, and Andreas was now able to think of starting a family. On June 13, 1708, he married Anna Schmidt, the daughter of a Strasbourg citizen.

Another joint work of the Silbermann brothers was the building of the organ at St. Peter's in Strasbourg. According to the contract dated August 10, 1708, the instrument was supposed to be completed by Whitsunday, 1709, and was to have twenty-one stops, two "complete" manuals (with C sharp), four bellows, and 1293 pipes, and it was to cost 2100 florins. Its resources were:

Hauptwerk	**Rückwerk**	**Pedal**
16′ Bourdon	8′ Coppel	16′ Subbass
8′ Prinzipal (in the case)	4′ Prinzipal	8′ Oktavbass (added later)
8′ Coppel	3′ Nazard	4′ Préstant
4′ Oktav	2′ Oktav	IV Mixtur
3′ Quint	1 3/5′ Terz	8′ Trompetenbass
2′ Superoktav	III Mixtur	
1 3/5′ Terz		
III Mixture (from 1 1/2′)		
III Cymbel		
V Cornet		

Gottfried Silbermann built most of this organ. At its completion it was considered excellent, and Gottfried was given the title of "Master" by his brother. This organ still existed in 1840 and was probably destroyed during the siege of Strasbourg in 1870. The pitch was "Cornetton." Lobstein examined it in 1840 and found it a full tone higher than "Kammerton," which at that time meant 435 A. An extensive renovation was executed by Konrad Sauer in 1820, when one Mixture was replaced by a Flute and the Pedal was enlarged by the addition of a Faggot.

Kuhnau reported to Matthesen, in a letter which the latter published in 1720 in his "Critica Musica," that Gottfried Silbermann had constructed "some marvelous organs at various places in France" before he began his last work in Strasbourg, the organ at St. Margaret's Convent. This convent organ was begun in 1709 but was never completed. Here, in the quiet and peace of the convent, occurred an incident which surrounded Gottfried with a halo of romanticism. He fell in love with a nun, and decided to elope with her. The plan failed. According to the story, as they were preparing for a secret departure, Silbermann had already received from his beloved a box containing jewels when

a noise aroused the convent. Silbermann himself was able to escape with the precious box, but he had to leave his intended bride behind. The memory of this beloved woman who he knew was exposed to a terrible fate, and the reproach that he himself had brought about the tragic consequences, determined him to remain a bachelor. It is not surprising, therefore, that Gottfried Silbermann became the hero of a novel called "The Secret of the Organ Builder" (Pierson, Dresden). The novel's principal theme is the abduction of the nun at Strasbourg. In it, the student, Philip Telemann, who was to become a famous composer, comes to the rescue in time of danger. This same subject is used by Nagler in his short story, "Flute d'Amour" (Kistner, Leipzig).

Before following Gottfried Silbermann further in the study of his life, let us turn to the life work of Andreas Silbermann and first examine the disposition of the organ at Maursmünster which he built in 1710. Here we have a great opportunity to observe Andreas' system of organ building in detail, because this organ has not undergone any changes since its installation.

I MANUAL (middle keyboard) 49 keys
16′ Bourdon (3 lowest octaves pine wood, remainder lead)
8′ Prinzipal (tin)
8′ Bourdon (lowest octave oak wood, remainder lead)
4′ Oktav (tin, feet lead)
2′ Oktav (tin, feet lead)
2 2/3′ Quinte (lead)
1 3/5′ Terz (lead)
V Rank Cornet (8′ from middle C upwards, lead)
III Mixtur (tin, feet lead)
III Zimbel(tin, feet lead)
8′ Trumpet (upper part of resonators tin)
4′ Clairon
4′ Vox Humana (reed)

II MANUAL (lower keyboard) 49 keys
8′ Bourdon (C oak wood, from C sharp upward lead, with chimneys from middle C)
4′ Flute (lead with chimneys from 2′ C)
2′ Oktav (tin, feet lead)
2 2/3′ Quinte (lead)
III Mixtur (tin, feet lead)
1 3/5′ Terz
8′ Krummhorn

III MANUAL (upper keyboard) 25 keys from Middle C upward, speaking without a stop knob
8′ Rohrflöte
4′ Oktav
2 2/3′ Quinte
2′ Oktav (a stob knob for this rank)
1 3/5′ Terz

PEDAL 25 keys
16′ Flötbass (pine wood)
8′ Oktavbass (metal)
4′ Flute (lead)
16′ Trombone
8′ Trumpet

The pedal coupler is missing. There is a tremolo for the entire instrument and a slide coupler for Manuals I and II.

The masterpiece of Andreas Silbermann was the rebuilding of the organ in Strasbourg Cathedral, which became almost entirely a new instrument. The old one had been originally built by Krebser of Ausbach from 1489 to 1492. It had been repaired in 1608 by Neuknecht, who came from Bohemia and later lived in Bavaria; then it was enlarged by various additions to its pipes, from 1658 to 1660, by Matthias Tretscher of Kalmbach and his pupil, Tobias Dressel. When Andreas Silbermann inspected this old organ, it had the following resources:

Hauptwerk
16′ Prinzipal
8′ Oktav
8′ Viol de Gambe
8′ Quintaton
6′ Quint
4′ Oktav
4′ Spitzflöte
V Mixtur
IV Cimbel

Rückpositiv
8′ Prinzipal
8′ Viol de Gambe
8′ Coppel
4′ Flöte
4′ Oktav
3′ Nazard
3′ Quinta
2′ Oktav
II Sesquialtera
V Mixtur

Brustpositiv
"with 7 little useless stops, about 389 pipes"

Pedal
16′ Trombone
32′ Prinzipalbass

Tuned in French pitch

On July 24, 1713, Andreas Silbermann submitted a plan in which he suggested what could be used of the old organ. The new organ would contain 2001 pipes and would cost 3640 florins. It's resources would be disposed as follows:

HAUPTWERK 49 keys
16′ Prinzipal, from the old organ
16′ Coppel, new (16′ Bourdon)
8′ Oktav, old, with some new pipes (8′ principal)
4′ Oktav, new (4′ Préstant)
3 1/5′ Terz, from the old 6′ Quint which was useless
3′ Nazard, new (2 2/3′ Nassat)
2′ Doublette (2′ Oktave)
1 3/5′ Terz
III Cimbale
V Cornet, from middle C upward
16′ Trumpet
8′ Trumpet
4′ Clairon
8′ Voix Humaine

PEDAL
32′ Prinzipalbass, old pipes repaired
16′ Oktavebass automatically drawn with the 32′ Prinzipalbass
16′ Prinzipal
Note: It was intended that these first three stops should be adaptations from old pipes. The 16′ Prinzipalbass, however, was too long for the case, and the 16′ Oktavebass was actually a double-mouthed Subbass.
8′ Oktave
4′ Prinzipal
16′ Bombarde "instead of the unsteady little Trombonebass"
8′ Trumpet
4′ Clairon

POSITIV
8′ Prinzipal
8′ Coppel
4′ Oktave (Préstant)
4′ Flute
2 2/3′ Nazard
2′ Doublette (2′ Oktave)
1 3/5′ Terz
III Mixtur
III Cimbale
8′ Cromhorne
1 1/3′ Larigot

BRUSTWERK
The stops of this combination were supposed to be the relocated Cornet of the old Hauptwerk: "There the new Echo stop made of old pipes could be placed." These were as follows:
8′ Coppel (8′ Bourdon)
4′ Oktave (4′ Préstant)
3′ Nazard
2′ Doublette (2′ Oktave)
1 3/5′ Terz
To these were added:
8′ Prinzipal
III Mixtur
8′ Trompete
8′ Voix Humaine
4′ Clairon

(Stop names in parentheses indicate their later designation in the organ as it was finally built, whenever the name was changed.)

The largest pipe was placed in the middle of the case. It was 24 feet long, and its diameter was 1 foot and several zolls (old inches). It weighed 342 pounds, and its cubic content was 136 gallons. The six wooden chests were perfectly made, just as were the 6′ x 12′ bellows.

An important addition was effected by Georg Wegmann, of Mackenheim, Alsace, in 1833 and 1834, in completing the compass of the Echo Manual by the addition of bass octaves, and by adding two new stops, then in 1840 six more. The entire organ was completely altered in 1896 by Koulen.

Most of the organ cases of the Strasbourg Silbermanns show a Rückpositiv as at St. Peter's in Strasbourg and at Maursmünster. The Rückpositiv in Strasbourg is considered to have been the first in Germany, having been originaly installed in the period 1489 to 1492. The case work of the organ at St. Thomas' in Strasbourg is particularly noteworthy because of its effective arrangement of the pipes in the space, giving a picturesque impression of the rosette window as the main feature.

Principal pipes were placed in the case. They were made of good metal, rich in tin. The French name "Préstant" indicates that the Principals, according to old tradition, formed the first row of pipes. This name is to be found in Andreas Silbermann's earliest dispositions, as is the term "Montre," indicating pipes that are exhibited. The pipe walls of the 8′ Principal in Maursmünster contain more than 76 per cent tin. Probably this same proportion was used by Silbermann for all his other Prospekt Principals. When he built the new organ for the Strasbourg Cathedral, he left the beautiful Gothic case untouched at first. He hardly did this from reverence, as no period was more intolerant of Gothic art than the Baroque. (It was only after Goethe wrote his magnificent words about Strasbourg Cathedral that appreciation of Gothic art monuments was revived.) He only wanted to preserve everything that seemed to him usable. However, he changed the 32′ Principal of the old organ into a 16′ Principal. In order to keep the space of these large pipes occupied, he left overlengths so that the lowest note on 16′ C came from the largest pipe of the old organ. This pipe was 27 feet 9 inches long and 1 foot 3 1/2 inches in diameter. This would produce approximately our 32′ D. But such a D in the 32′ range was unknown at the time of the building of this organ. At about the middle of the fifteenth century, Traxdorf of Mainz extended the Pedal range down to 32′ A for the first time, and towards the end of the century, Conrad Rothenburger of Nürnberg added 32′ G and F to the Manual as well as to the Pedal. This limit of the low range is mentioned in Schlick's "Mirror" of 1511. So it follows that the old 32′ F sounded the same note as our 32′ D. Consequently the pitch of the Strasbourg Cathedral organ must have been a minor third lower than our modern pitch. Schlick makes it clear that this low pitch was in general use. He called it "chormass" and described it as most appropriate for singers and instrumentalists. There can be no doubt that the cathedral organ was tuned at that low pitch. Against the hypothesis that the pipes of the Principal may have originally been cut open in the back stands the fact that such a practice was not customary in old organ building. Pipes with such overlength were first commended as a "rare" feature by Boxberg in his description of the Görlitz organ. Probably Andreas Silbermann, who followed this procedure in the Prospekt Prinzipals of the Strasbourg organ, had learned it from Casparini. "The largest pipe in the cathedral organ had a capacity of about 125 gallons, and the smallest one held little more than would go into a thimble." On this large pipe there is a sixteen-line inscription which begins with "Laudate Dominum in cordis et organis" ("Praise the Lord with organ and strings," Psalm 150), and which ends with the modest note: "Factum per Andream Silbermann 1714" ("Made by Andreas Silbermann in 1714"). The following significant words appeared at the mouth of this pipe in 1873: "Bombarded by the Germans in the middle of September, 1870. Restored at the order of Gustav Klotz (Architect of the Cathedral of Notre Dame) by the Wetzel Brothers of Strasbourg. May France live!"

The Strasbourg Cathedral organ attained a certain reputation because of its knickknacks. They were mentioned as early as 1325 and have been the subject of innumerable remarks by writers, most of whom protest against these trifles, although some praise them as great works of mechanical art. They have been called the distinctive mark of the city of Strasbourg. No traveler in former centuries failed to see these knickknacks, together with the cathedral clock. While Casparini attached these knickknacks to his organ cases, in de-

ference to the crowd which loves a spectacle, the more progressive Andreas Silbermann did not cater to popular taste in this respect.

Of the subsequent history of this organ, it should be noted that Johann Andreas Silbermann cleaned the organ his father had built, in 1753, 1765, and 1780. In 1796, the organ builder Johann Conrad Sauer proposed tuning the instrument half a tone higher. The then substitute organist, Johann Neumeyer, opposed this suggestion, stating that it would work serious injury to the entire instrument.

Early in the present century, the pillar that supports the organ case showed deep cracks, so that the collapse of the organ was feared. It was caused by a mouldy foundation which first had to be removed and then relaid securely. On this new foundation a new pillar was built. The case was removed and safely hidden in the crypt during World War I, after which the entire instrument was rebuilt with electro-pneumatic action.

The architectural construction of the cathedral organ was quite intricate. When Zelter went into the inside of the organ, he was astonished by the efficiency with which the space had been utilized. In September of 1816 he wrote to Goethe: "The singular fact about this organ seems to be that no builder gave any thought to a proper place for it. Therefore the space had to be chosen and taken right where it is, and its location seems to be the most dangerous in the church because of the proximity of a hollow space underneath the towers. This master organ builder not only provided the instrument with such voices as are suited to the cathedral building, but also built the entire instrument in such a compact manner that everything fits like shot in a shell and powder in a rifle. There is no wasted space. From outside it looks like new, not even the display pipes are tarnished, and the effect is very grand." The high position of the organ was inconvenient at the time of its building and it has continued to be a daily trial to the organist, who plays the organ twice daily and must therefore tread up and down a total of 548 steps each day (since it is more than fifty feet above the floor).

In most other Silberman Prospekts, the pipes were arranged so that the rosette appeared as a crown. This, however, was accompanied by the disadvantage that dust, rain, and snow could sometimes cause damage; and that is the reason why some of his organs have been rebuilt.

The keyboard of organs built by Andreas Silbermann and his sons is complete with C, C sharp, and c^3 in the manuals, and C, C sharp, and c^1 in the pedals. In this matter he deferred to the requirements of a new generation. In the console, stop knobs were on both sides of the player, but often in a rather primitive arrangement. In the Maursmünster organ, the Flötebass and the 8′ Oktavbass cannot be stopped off and are on all the time. Other pedal registers, such as 16′ Trombone, 8′ Trumpet, 4′ Flute, are controlled by knobs about 20 inches above the floor. The stop knobs of the Rückpositiv are inconveniently located at the Rückpositiv itself. They are behind the player in a single row, one above the other. The knobs of the other stops are, as usual, at the right and left of the keyboard. The third manual of this organ is the Echo Organ, fitted, according to a French custom, with a five-rank Cornet which is silent in the two lowest octaves. These incomplete key manuals, as well as the incomplete "Clavier de Récit," were familiar in France, having been mentioned by Dom Bédos, but uncommon in Germany.

The keys were made of ebony and bleached bone. The manuals could be connected by sliding couplers. Silbermann instruments became famous for the light touch with which they could be played. Their channels were narrow and hence required only small, easily moved valves. The easy touch was also the result of light wind pressure, which varied from about 2″ to 2½″. This is also the explanation of the noble sound of Silbermann's voices.

When a Silbermann organ is played in the modern way with full chords, then the narrow channels take the wind away from each other. The wind drops and the organ seems out of tune; it "sobs." This wavering of the wind at the cathedral organ has caused criticism of Silbermann. It is not fair, however, to make the same requirements of an organ that is two hundred years old as of a modern one. Also, a six-voiced chord is seldom found in the works of such polyphonic masters as Georg Muffat, Kasper Kerll, Pachelbel, and Bach; the Silbermann organs are well suited to the performance of their works. The ideal tone quality and texture that these composers wanted to achieve appears to be perfectly realized in these organs. For modern organ playing the channels of Silbermann's slider chests are too narrow, but for his own period they were sufficient.

Andreas Silbermann used six 6′ x 12′ folding bellows for the cathedral organ. Even today no fault can be found with such bellows when they are well built and have these measurements, and open to a sufficiently wide angle. Zelter commended the "tremendous lungs" of this organ. The bellows are raised by a very ingenious and secure device. Lead weights were fastened to them and only the operator of the bellows could expand them. There was a rope from the end which passed over pulleys and into a sort of stirrup. The operator stepped into that stirrup and pulled the bellows up with the weight of his body; the lead weights then compressed the bellows with a steady uniform pressure. According to Zelter's estimate, the capacity of these bellows was 100 cubic feet. Consequently they must have opened to about three feet. Gottfried Silbermann used the same invention for the bellows of the Freiberg Cathedral organ.

Mozart was in Strasbourg in 1778 and played the two organs built by Johann Andreas Silbermann. There is no record of his having given any opinion or description of their tonal character. Zelter stated, however, that the organs of the Strasbourg Silbermanns possess such extraordinarily beautiful tone that they should be recognized among the finest organs of all the great masters. On September 10, 1816, he attended an ordinary service of which he reported to Goethe that the only feature was "the beautiful cathedral organ."

Although in modern times there has been some feeling that the light "argentine" tone quality that fits the joyous mood of Baroque music is inadequate for music of our period, one could certainly wish that some of the tonal splendor of a Silbermann organ could replace the dull tone of the instruments that were built in the late nineteenth and early twentieth centuries. The Alsatian Silbermanns were much admired in France where the preference for organs with many upper voices has continued without interruption. The principal representatives of the so-called Alsatian, neo-German organ reform, which really sprang from the French organ school, made the expression "back to Silbermann" a sort of battle cry. It must be admitted that this purposeful agitation for a new German organ has been a blessing, if for no other reason than because it induced many people to interest themselves in the most vital questions affecting the

future of German organ building, who might otherwise have given no attention to these matters.

Tonal differentiation between the manuals is found in Andreas Silbermann's organs and those of his pupils. Not only the Principal family, which includes Mutations and Mixtures, but also the Bourdons, were scaled directly according to the manual to which they belonged. The Principal, with its family of related stops, is generally considered the most beautiful voice of a Silbermann organ. According to experts, this beautiful, full, round, and noble tone is due to the absence of slotting and nicking. All stops which are voiced with these devices immediately become "stringy." A sharpness of tone develops because a series of overtones with an unpleasant sound then speak out prominently. The 16′ and 8′ Principal of the Great are all wide scales. In the works of Johann Andreas Silbermann, the Elder, the tendency gradually to widen the scales of the Great can be noted.

The Principal formed the base of the "argentine" tone which the Alsatians sought to perfect. "This full and round 8′ tone could be reinforced and clarified by a 4′ tone, could be sharpened by a 2′ tone, and darkened a little by a 16′ tone. It could be colored by a Quint and Terz." The auxiliary voices of the Silbermann organs were particularly suited for effective combinations with the Gedeckts, Rohrflötes, and Gambas, because of their delicate voicing. Many modern organists look upon the overtone stops only as a means of increasing the tone, and thus disregard the most colorful effects. The material of which these pipes are made might be an explanation of the unobtrusive but definite tone color of Silbermann's Mutations. It is a lead alloy in the proportion of two parts of lead to one part of tin. Admixtures of iron in the alloy seem to pollute the lead with respect to the tin. Silbermann's Quinte belongs to the Gedeckt family, as the two lowest octaves were always covered. The tuning of these pipes was effected in a crude manner, by means of large ears. Nowadays movable metal caps on each pipe are used for tuning. The independent 1 1/ 3′ Quinta is called "Larigot" by Andreas Silbermann in the Strasbourg Cathedral organ (from the French "L'Arigot," a spelling still in use at Mersenne).

The reputation of the Kornett as the most beautiful of all Silbermann Mixtures is fully justified. One critic said, "His Kornett is glorious; it always begins with middle C and is usually of five ranks when built by Andreas Silbermann, but sometimes only of four ranks when built by Johann Andreas Silbermann." One must applaud its beautiful fullness and roundness which today is still exemplary. According to the French fashion, which may be regarded as an imitation of the Spanish custom of placing reed voices in the front of the organ, Andreas Silbermann and his pupils always placed the Kornett on a special mounted chest about 32 inches above the main chest, directly behind the pipes of the Prospekt. In Alsace, the Kornett served as a solo voice. Its exposed position emphasized its particular character more than if it were placed in a row among the Mixtures on the main chest. As a solo voice it did not repeat, had no breaks. It was meant for the treble where it supported the reeds, which lose their brilliant quality in the upper range just where the labial stops gain in intensity. The two lowest octaves of the Kornett could be omitted because there the reed voices produce sufficient "penetrating power." The special, horn-like character was achieved by the wide scaling and the closely spaced ranks of harmonics. The order of these ranks was: 8′ Rohrflöte; 4′ Oktav; 2 2/3′ Quinta; 2′ Oktav; 1 3/5′ Terz.

The softness of the voicing was ensured by the lead alloy used in the pipes. In 1710, Andreas Silbermann constructed in Maursmünster, in addition to the Great Kornett, an Echo Kornett which was placed inside the organ. In 1734 another Alsatian organ builder named Rohrer planned to build another such Kornett on the Clavier de Récit. On so doing he was deferring to a Parisian practice, where organs with four manuals were already quite common. In France, the Cornet was an important solo voice. According to Bédos, the Cornet should not be drawn in the Plein Jeu [full flue'work] although it may properly be combined with reeds as in the Full Great organ. Otherwise the Cornet should not be drawn in the Plein Jeu [full flue-work] although it may Cornet should only be used as a solo stop. The twenty-six rules of Bédos provided French organists in the period around 1750 used these strong ingredients infrequently. Bédos said, "The accompaniment should only embellish and support." He might not have approved of having the organ lead the singing of congregations in a strictly prescribed manner, which has become the main function of the organ in Germany since the Reformation. Goethe once spoke to Zelter about the organ as the "tyrant" of church and congregation. Even though the great poet probably spoke these words in jest, he pronounced a rather severe judgement. Nowadays there must be others who share this opinion; but Protestantism is dependent upon an organ fitted with Mixtures and Cymbels in order to lead the singing of the congregation.

Andreas Silbermann and his pupils included such stops in their specifications. A three-rank Mixture that Andreas Silbermann built in 1710 begins on the lowest note with 1 1/3′ Quinta, 1′ Oktav, and 2/3′ Quinta, while the three-rank Cymbel has for the same key 1/2′ Oktav, 1/3′ Quinta, and 1/4′ Oktav. These stops are not supposed to be sharp sounding, and produce an interesting effect. The relationship between Mixture and Cymbel is best explained by the following chart:

Mixtur				Cymbel			
12 notes	19	22	26	12 notes	29	33	36
12 notes	15	19	22	12 notes	22	26	29
12 notes	8	12	15	12 notes	15	19	22
13 notes	1	8	12	6 notes	12	15	19
				7 notes	8	12	15

However, sometimes the lower Mixtur Chorus began with 2′ Oktav (15), 1 1/3′ Quinta (19), 1′ Oktav (22).

The Silbermann Gedeckts and Rohrflötes, which are remarkable for their soft, dark colored, "velvety" tone, changed from one into the other at certain points in the gamut. The Gedeckts have chimneys in the upper octaves, and Rohrflötes are covered in the lowest octave. In the Rohrflöte of St. Thomas' church in Strasbourg, the chimneys are conical from 4′ C to 2′ C. This kind of construction does not appear anywhere else in Silbermann organs, but it is to be found in the organs of Martin von Hayingen. The tuning of Silbermann's stopped wooden pipes is so difficult as to be almost impossible. It has to be done by pulling out the stoppers with ropes, or by hammering them in.

All other stops are absent from Alsatian organ building. Others, known to us as "character voices", appeared frequently in German organ building from the sixteenth century on. Thus it may be seen how quickly Alsatian organ building became French. The real flue character voices have never existed in French organ building; they were not wanted. To the French, flutes as solo

voices lacked sufficient brilliance, and in combinations Flutes were too assertive for French taste. The French use some flutes today, but they are flutes that have been newly vitalized by Cavaillé-Coll. They do imitate the tone of the flute ingeniously and develop great strength.

On the other hand, preference for reed voices is typically French. The dispositions of the Alsatians show that they also favor this type of voice. Stop lists of the organs at St. Peter's in Strasbourg and in Maursmünster show how abrupt this transition in taste was with Andreas Silbermann. The former had only one reed, an 8′ Trumpetbass, with twenty labial stops, while the latter, with twenty-two labial voices, had six reeds. In modern times Silbermann reeds (16′ Bombarde, 16′ and 8′ Trompette, 8′ Cromhorne, 8′ Voix Humaine, and 4′ Clairon) have been much criticized. Their tone is said to be bad and their construction faulty. But experience shows that reed voices deteriorate through the years, especially if they are not properly cared for.

It is interesting to note that Alsatian organ builders experimented with the Voix Humaine. The most effective reed stop that we find in Alsace, however, is the 16′ Bombarde. It is a mistake to translate this stop name as Trombone. Praetorius considers the Trombone one of the "Schnarrgedackten" which either was completely covered or gradually opened up towards the highest range. Some German organ builders continued to build this type until the beginning of the nineteenth century. The more modern Bombarde shows definite French influence in its construction. They are open, have inverted conical bodies and the typical blocks which are cylindrical in the lower octaves and round elsewhere. These are soldered to the shells into which the resonators are fitted. The importance of the Bombarde in French organs is evident from the name "Clavier des Bombarde". This third manual has, in addition to strong reed voices, some soft labial voices, although it takes its name from the Bombarde which is found in it. The Trompette is similarly constructed and of the same importance in the French organ. Alsatians built them at 16′ and 8′ pitch. A 16′ Trombone and a 16′ Trompette had to be ingeniously differentiated in their voicing as the Trompette should not possess the "thundering" quality of the Trombone, which was achieved by wide scaling. The Trompette was definitely a melody voice, which is clearly implied by the term "Trompette de Récit." In the disposition it was placed with the Cornet on the "Clavier de Récit." This manual had only thirty-seven keys from middle C upward. Johann Andreas Silbermann intended to build something like this in the St. Thomas organ at Strasbourg. Where the compass is complete, there should be separate stop knobs for Bass and Treble, Trompette and Clairon respectively, so that more combinations are available. Such divided stops are a part of the oldest tradition in German organ building. The continuation of the Trompette in the higher octaves was taken over by the Clairon. Silbermann sometimes made it repeat in the higest octave.

Cromhorne and Voix Humaine were similar in their construction and sound. The Cromhorne originated in Germany, as this early form of the name indicates (literally, "crooked horn"). The Voix Humaine is probably of French origin. It appeared apparently for the first time in 1551 in the original stop list of an organ at Troye. The well informed Boxberg also had heard that there were organs at Hamburg, Amsterdam, and Rochelle in France which imitated the human voice deceivingly. But he did not know whether these Voix Humaines were tremulous Principals like those of Casparini, or reed voices. According to

what is now known, the stops in those towns were probably reed voices.

The metal alloys used by the Alsatian Silbermanns are of interest. Analysis of the pipe metal of an organ built by Andreas Silbermann in the year 1710 showed a specific gravity of 7.45. (pure tin, 7.00). The tin used by his son, Johann Andreas Silbermann, contained sometimes as much as 99.6 per cent tin. The first alloy, the so-called "12 lötig" tin, was used for Mixtures and Octaves inside the organ, while Gedeckts, Quints, and Tierces were made from inferior metal consisting of two parts lead and one part tin. The metal sheets from which pipes were cut were hammered. The imprints of the hammering board are still distinctly visible. French organ building has retained this custom. Gottfried Silbermann used it for the purpose of "purifying the tone." The Alsatian organ builders coated their metal pipes with a yellow lacquer to prevent oxidation. The metal is in an excellent state of preservation at the present day.

Let us glance briefly at the personal lives of the Strasbourg Silbermanns. Andreas Silbermann and his wife, Anna Maria Schmidt, had twelve children, of whom four survived. The ability of the entire Silbermann family is demonstrated by the fact that they all followed their careers with significant accomplishments. The contact between Gottfried Silbermann, the uncle in Freiberg, and his relatives in Strasbourg was maintained although mostly by correspondence. The plan and disposition of the organ at St. John's in Zittau, which Gottfried built in 1740, was found in the organ at Bolchen, near Strasbourg, in 1913. Gottfried Silbermann had evidently sent it to relatives. Gottfried Silbermann was also godfather to his nephew, Johann Gottfried. The latter became his personal pupil in piano building, but it appears that Johann Daniel possessed all the love of the elderly Gottfried. Daniel Silbermann, whose first wife died in 1751, moved soon afterwards to Freiberg and was called upon by Gottfried Silbermann to complete the organ at the Catholic Court Church in Dresden. First he finished the organ in Frauenstein, which was begun by his uncle, and then devoted himself to the work on the Dresden organ, which he finished after Gottfried Silbermann died suddenly. He was the only heir of Gottfried's considerable fortune. Soon afterwards, Daniel received the favor of King Frederick August II and was granted a yearly pension and named "Court Organ Builder." He was also given the title of "Saxonian Court Commissioner." These honors were evidently intended to keep the distinguished organ builder, who had also become known as a performing artist, in Saxony. His heritage was given to him under the condition that he would permanently settle in Saxony. From then on, Daniel Silbermann's occupation was to care for and maintain the Dresden organs which his uncle had built. He possessed a special talent for building pianos. A eulogy written at the time of his death in 1756 says, "His clavecins cannot be praised enough, just as his pianos."

Furthermore, he was fond of mechanical works of art which were fashionable at the time. Even though subsequently he did not build any more organs in Saxony, he had completely mastered his art as an organ builder. This is demonstrated by his detailed, expert opinions in an organ-building lawsuit in Chemnitz which lasted for ten years. Daniel Silbermann could only enjoy his inherited fortune for a few years, as he died May 9, 1796, on a trip to Leipzig, while in the house of Rochenthiens, whose daughter, Susanne Christine, he had married shortly before.

Meanwhile, Johann Andreas Silbermann, the oldest son, had succeeded in enlarging his father's business considerably. He was received as a member of

the Senate of the city of Strasbourg. Johann Andreas gained some prominence as a chronicler of the Alsace. Among his numerous works the most important is his "Local History of the City of Strasbourg" (1775). He must have been an unusually active man. With all his work as an author, he never neglected his own profession. Lobstein mentions fifty organs that came from his workshop. Together with his younger brother, he also devoted himself to building pianos with unusual success. Louis Adam, who was an Alsatian, tells us, in the introduction to his famous book on the method of piano playing, that the first piano, which was invented and made by Gottfried Silbermann of Freiberg, was still to be seen in the house of the inventor's grandson in Strasbourg. Adam probably meant the grandnephew of Gottfried Silbermann. The Strasbourg organist, Sixtus Hepp, Adam's teacher, is said to have owned a Silbermann harpsichord with two manuals, together with a pedal pianoforte, but this may have been a two-manual wing-piano.

In Paris the instruments of the two Silbermann brothers sold for three hundred dollars, an unheard-of sum at that time. Strasbourg and Paris newspapers both praised the artistic skill of the builders.

At about 1745, Johann Andreas Stein came to study with Johann Andreas Silbermann in Strasbourg. He was one of the most distinguished instrument makers in the second half of the eighteenth century. He was also one of the first to recorgnize the virtues of the "Kegellade" (cone chest), and he improved upon it. In piano building he is credited with having invented the German or Viennese action, although this may be doubtful. His name will be remembered in the history of instrument making because of his many inventions in the field of piano building, which he developed almost to their modern form.

Another apprentice of Johann Andreas Silbermann was Schwarze, who in turn passed his plans, scales, and tools on to a Saxonian piano builder, Joseph Gottfried Horn, from Nickern near Dresden; and he became the founder of a respected family of instrument makers.

After the death of Johann Andreas Silbermann, his promising son, Johann Josias, continued his father's business; but he died early, after only three years of independent activity, in 1783. A sister of this Johann Josias Silbermann married the organ builder Alfftermann, who was a pupil of Johann Andreas Silbermann.

The last organ builder of the family was Johann Friedrich Silbermann, who lived at the time of the French Revolution, which wrought severe injury to Alsatian organ building. This last member of the family also devoted most of his time and energy to piano building.

The care of the Silbermann organs in Strasbourg was entrusted to Conrad Sauer and his son of the same name in about 1812. Upon the death of the son in 1829, it was taken over by the organ-building family Wetzel.

We know definitely from Johann Andreas Silbermann's autobiography that his father was a pupil of Casparini in Görlitz. As the principal feature of the instruction from this master, we find in Andreas Silbermann's organs the different scaling of the manuals and the striving for the ideal of uniform "argentine" tone. But Silbermann had to adapt himself to the French taste, and this was a vital problem for him. Because of that he omitted some stops found in Casparini's baroque organ, and in some instances he remodeled them to the French taste. For instance, his special kind of Kornett is more related to the typical French stop than to Casparini's Zynck. After the year 1710, dispositions of Silbermann's organs were scarcely any different from the stop lists of French organs of the same period.

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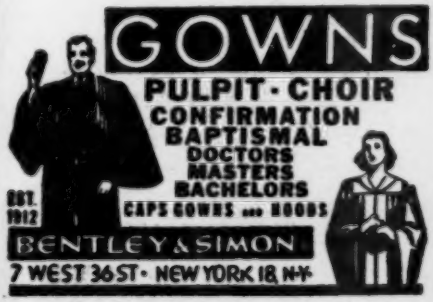

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